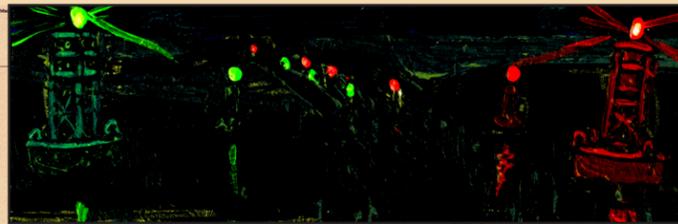


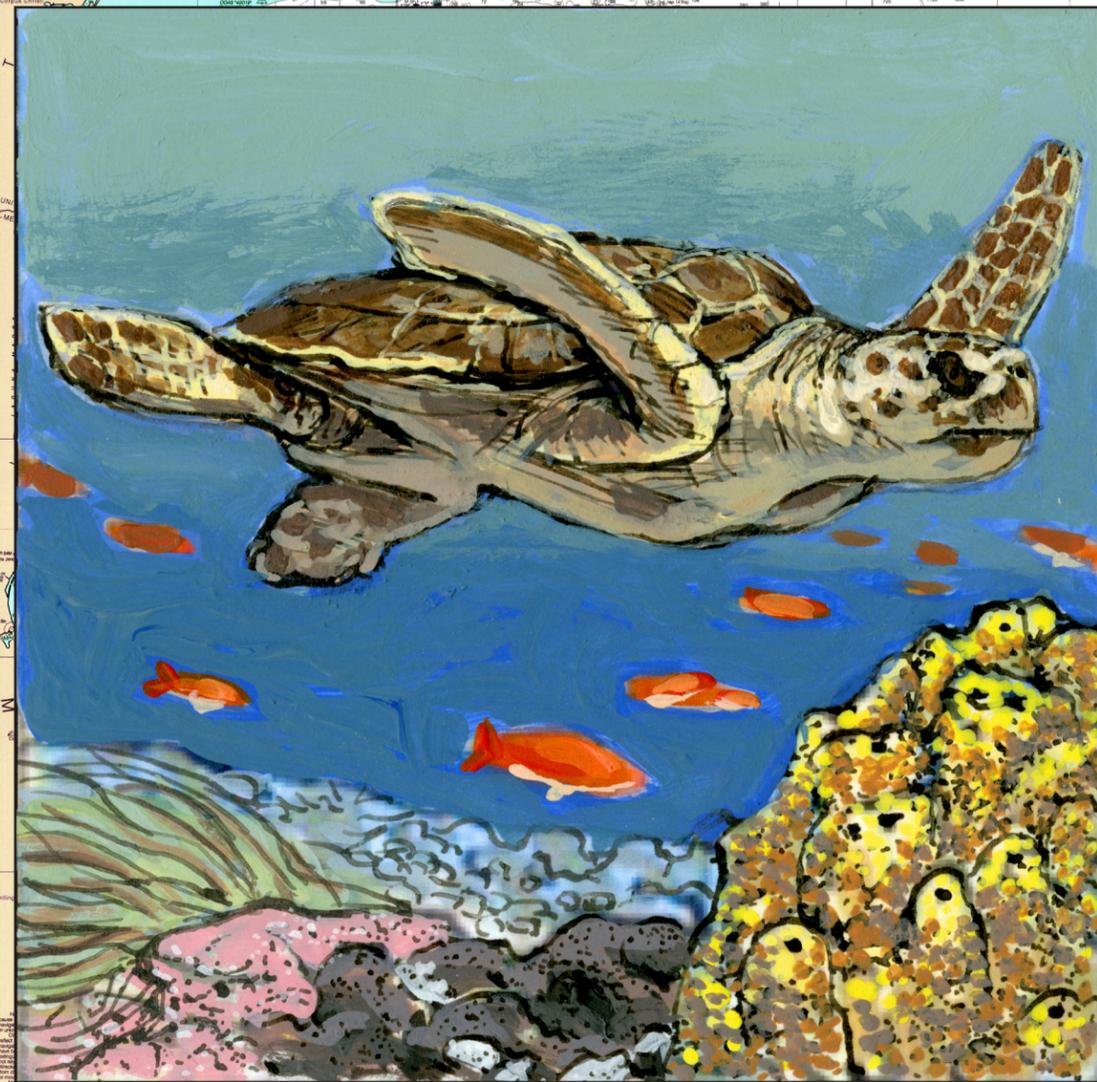
Nautical Chart of the Gulf of Mexico

At night, navigation lights of various colors and flashing rhythms guide and inform mariners. "Red Right Returning" is a basic rule. It means that a mariner should always keep the red-lighted buoys on the starboard (right) side when a guiding a ship from the ocean into port.



 Green-lighted buoy

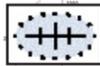
 Red-lighted buoy



Abandoned oil rigs and shipwrecks are threats to safe navigation. Symbols on charts and visual aids at sea point out these potential dangers. At night, buoys with quick-flashing white or red lights mark oil rigs, while buoys with two flashing white lights mark shipwrecks. An unexpected benefit: Abandoned oil rigs and wrecks turn into artificial reefs, which, in turn, create valuable fish habitat.



A partially submerged wreck



A dangerous wreck of unknown depth

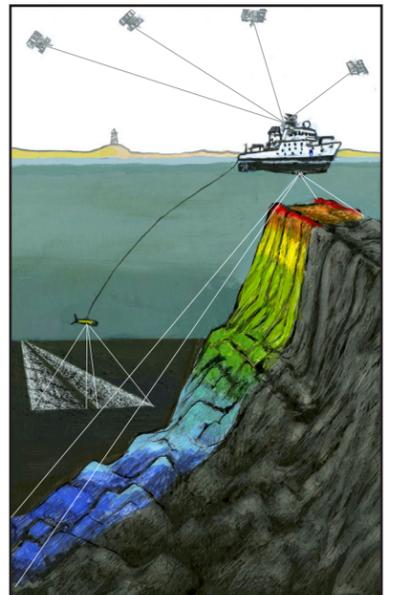
The small numbers on the chart represent the depth of the water in feet or fathoms. Six feet equals one fathom. These measurements are called soundings.



Years ago, hydrographers took soundings by throwing a line with a lead weight at the end into the water. When the weight hit the seafloor, they read the depth off of colored markers on the line. They used two sextants to find the position of the sounding in relation to the shore.



Today, NOAA hydrographic vessels take soundings with two kinds of sonar. Multibeam sonar sensors use 240 beams of sound to sweep the ocean floor and measure depths. The scans turn into a color image in which blue represents the deepest depths and red represents the shallowest depths.



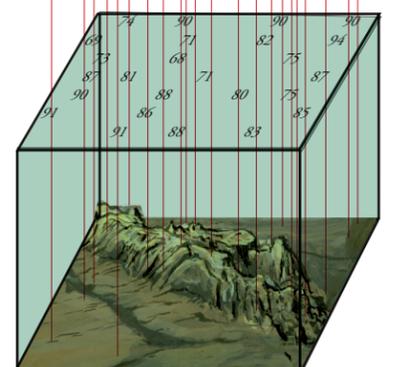
In side-scan sonar, ships tow torpedo-shaped scanners that emit and receive sound waves to form detailed images of sand, rocks, mud, and shipwrecks on the seafloor. Four GPS satellites pinpoint the position of each sounding.



Learn more about nautical charts at <http://www.nauticalcharts.noaa.gov>. Produced by NOAA's Office of Coast Survey

Office of Coast Survey cartographers select certain soundings from the thousands they collect to create easy-to-read charts. They usually pick the shallowest soundings. This "least depths" approach supports safety: The actual water depth will probably be deeper than the sounding recorded on the chart.

78	74	85	90	90	91	92	90	91	90	93	92	90	
69	70	71	73	75	71	73	74	77	82	86	92	93	94
84	73	72	70	69	68	69	70	71	75	67	75	86	90
90	87	85	81	74	72	72	71	80	86	87	88	85	87
91	90	93	90	89	88	84	82	80	80	74	73	75	79
91	93	91	92	87	86	85	83	82	81	80	81	80	85
93	92	92	90	91	91	90	90	88	86	86	83	84	81



Measuring and mapping soundings is a hard job because the seafloor is always changing.